

In the Claims:

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We claim:

1. (Currently amended) A device for thermoforming an object ~~(10)~~ presenting an undercut portion ~~(10B)~~ and a base portion ~~(10C)~~, the device comprising: a thermoforming mold ~~(12; 112)~~ having a base portion ~~(13; 113)~~ and at least two undercut-forming portions ~~(12A, 12B; 112A, 112B)~~ in the vicinity of an open end ~~(12')~~; a countermold ~~(18; 118; 218)~~ having an end ~~(18'; 118'; 218')~~ that is suitable for co-operating with said end of the mold so as to clamp a piece of thermoplastic material thereagainst and so as to co-operate with said portions of the mold to define a thermoforming cavity ~~(16)~~; and a thermoforming piston ~~(20)~~ that is mounted to move between a thermoforming active position in which ~~itsaid piston~~ penetrates into said cavity ~~(16)~~ and an inactive position in which ~~itsaid piston~~ is situated outside said cavity, the two undercut-forming portions of the mold being suitable for being moved apart so as to enable the object to be unmolded; ~~said the device being characterized in that it further comprises~~ comprising holding means ~~(23A, 23B; 223A, 223B, 223C)~~ suitable for holding the object ~~(10)~~ relative to the countermold ~~(18; 118; 218)~~, and ~~in that~~, in order to unmold the thermoformed object, said portions ~~(12A, 12B; 13; 112A, 112B, 113)~~ of the mold ~~(12; 112)~~ and the holding means ~~(23A, 23B; 223A, 223B, 223C)~~ are being suitable for being controlled in a sequence in which the undercut-forming portions ~~(12A, 12B; 112A, 112B)~~ of the mold ~~(12; 112)~~ are moved apart, said holding means ~~(23A, 23B; 223A, 223B, 223C)~~ are active and hold the object ~~(10)~~ relative to the countermold ~~(18; 118; 218)~~, and at least the base portion ~~(13; 113)~~ of the mold ~~(12; 112)~~ is spaced apart from the countermold while the holding means are active.

2. (Currently amended) A device according to claim 1, ~~characterized in that~~ wherein the undercut-forming portions ~~(12A, 12B; 112A, 112B)~~ of the mold ~~(12; 112)~~ are constrained to move with the base portion ~~(13; 113)~~ of the mold.

3. (Currently amended) A device according to claim ~~1 or 2~~, ~~characterized in that~~ 1, wherein the mold ~~(12; 112)~~ and the countermold ~~(18; 118; 218)~~ are suitable for being moved ~~(e)~~

relative to each other in order to place ~~their respective ends (12', 18', 118')~~thereof out of contact before the two undercut-forming portions ~~(12A, 12B; 112A, 112B)~~ of the mold are moved apart.

4. (Currently amended) A device according to ~~any one of claims 1 to 3,~~
~~characterized in that it~~claim 1, further ~~comprises~~comprising pick-up means ~~(30A, 30B)~~ suitable for picking up the object after ~~itsaid object~~ has been unmolded, said pick-up means and the holding means ~~(23A, 23B; 223A, 223B, 223C)~~ being suitable for being controlled such that the pick-up means ~~(30A, 30B)~~ pick up the object ~~(10)~~ while the holding means ~~(23A, 23B; 223A, 223B, 223C)~~ are holding said object against the end ~~(18'; 118'; 218')~~ of the countermold ~~(18; 118; 218)~~, then the holding means ~~(231, 23B; 223A, 223B, 223C)~~ cease to hold the object ~~(10)~~ and the pick-up means ~~(30A, 30B)~~ are moved to bring the object out of the thermoforming device.

5. (Currently amended) A device according to ~~any one of claims 1 to 4,~~
~~characterized in that~~claim 1, wherein the holding means comprise holding members ~~(23A, 23B; 223A, 223B, 223C)~~ suitable for being moved between an active position in which ~~theysaid~~members are suitable for holding the object ~~(10)~~ relative to the countermold ~~(18; 118; 218)~~ and an inactive position.

6. (Currently amended) A device according to claim 5, ~~characterized in that~~wherein the holding means comprise fingers ~~(23A, 23B)~~ secured to ~~or integral with~~ arms ~~(22A, 22; 122A, 122B)~~ that are hinged to the countermold ~~(18)~~.

7. (Currently amended) A device according to ~~any one of claims 1 to 6,~~
~~characterized in that, for the purpose of unmolding the object, said portions (12A, 12B, 13; 112A, 112B, 113) of the mold and the holding means (223A, 23B) are suitable for being controlled in a sequence in which, in succession, the undercut forming portions of the mold (12A, 12B; 112A, 112B) are moved apart, the holding means (23A, 23B) go from an inactive position to an active position in which they hold the object (10) relative to the countermold (18; 118), and the base portion (13; 113) of the mold is moved apart from the countermold. wherein~~
the holding means comprise fingers integral with arms that are hinged to the countermold.

8. (Currently amended) A device according to claim 7, ~~characterized in that~~ 1, wherein, for the purpose of unmolding the object, said portions of the mold and the holding means comprise fingers (23A, 23B) which are mounted to move in the join plane in which are suitable for being controlled in a sequence in which, in succession, the undercut-forming portions (12A, 12B; 112A, 112B) of the mold (12; 112) join of the mold are moved apart, the holding means go from an inactive position to an active position in which said holding means hold the object relative to the countermold, and the base portion of the mold is moved apart from the countermold.

9. (Currently amended) A device according to ~~any one of claims 1 to 7, characterized in that the holding means (223A, 223B, 223C) are suitable for taking up an inactive position and an active position in which they define a portion of the wall of the thermoforming cavity (10) and in which they are suitable for holding the object relative to the countermold (218), and in that said holding means are suitable for occupying their active position while the object is being thermoformed, and while~~ claim 8, wherein the holding means comprise fingers which are mounted to move in a join plane in which the undercut-forming portions (12A, 12B; 112A, 112B) of the mold are being moved apart join.

10. (Currently amended) A device according to ~~claims 5 and 9, characterized in that the holding members (223A, 223B, 223C) present edge portions (223'A, 223'B, 223'C) which, when said members are in the active position, define, at the end (218') of the countermold (218), a closed outline in which a pellet of thermoplastic material (201) disposed on the end (218') of the countermold can be wedged for the purpose of being thermoformed in order to form said object.~~ claim 1, wherein the holding means are suitable for taking up an inactive position and an active position in which said holding means define a portion of the wall of the thermoforming cavity and in which said holding means are suitable for holding the object relative to the countermold, and wherein said holding means are suitable for occupying the active position thereof while the object is being thermoformed, and while the undercut-forming portions of the mold are being moved apart.

11. (Currently amended) A device according to claim 10, ~~characterized in that the holding members (223A, 223B, 223C) are supported resiliently wherein the holding means comprise holding members suitable for being moved between an active position in which said members are suitable for holding the object relative to the countermold (218) between a wedging position in which, with the mold (12) being spaced apart from the countermold (218), said members project beyond the end (218') of the countermold over a given projection distance (DE), and a retracted position in which said projection distance is a distance (DF) that is reduced or optionally zero and an inactive position and wherein the holding members present edge portions which, when said members are in the active position, define, at the end of the countermold, a closed outline in which a pellet of thermoplastic material disposed on the end of the countermold can be wedged for the purpose of being thermoformed in order to form said object.~~

12. (Currently amended) A device according to claim 10 or 11, ~~characterized in that each of the edge portions (223'A, 223'B, 223'C) is provided with at least one anchoring piece in relief (224) for anchoring into the thermoplastic material, wherein the holding members are supported resiliently relative to the countermold between a wedging position in which, with the mold being spaced apart from the countermold, said members project beyond the end of the countermold over a given projection distance, and a retracted position in which said projection distance is a distance that is reduced or optionally zero.~~

13. (Cancelled) A method of thermoforming an object (10) presenting an undercut portion (10B) and a base portion (10C), the method consisting in: using a thermoforming mold (12; 112) having a base portion (13; 113) and at least two undercut-forming portions (12A, 12B; 112A, 112B) in the vicinity of an open end (12'); clamping a piece of thermoplastic material by means of the end (18'; 118'; 218') of a countermold (18; 118; 218) against said end of the mold; defining a thermoforming cavity (16) with said mold portions; bringing a thermoforming piston (20) into a thermoforming active position in which it penetrates into the cavity (16) of the mold from an inactive position in which the piston is situated outside said cavity; and, in order to enable the object to be unmolded, moving said undercut-forming portions of the mold apart;

said method being characterized in that, for the purpose of unmolding the thermoformed object (10), it further consists in moving the undercut-forming portions (12A, 12B; 112A, 112B) of the mold apart, and in moving the base portion (13; 113) of the mold away from the countermold (18; 118, 218) while holding the object (10) relative to the countermold.

14. (Cancelled) A method according to claim 13, characterized in that, while the object (10) is being held relative to the countermold (18; 118; 218), the undercut-forming portions (12A, 12B; 112A; 112B) and the base portion (13; 113) are moved away from the countermold (18; 118; 218).

15. (Currently amended) ~~A method according to claim 13 or 14, characterized in that, before~~claim 24, wherein, while the object is being held relative to the countermold, the undercut-forming portions (12A, 12B; 112A, 112B) of the mold are moved apart, the mold (12; 112) and the countermold (18; 118; 218) are moved relative to each other so as to place their respective ends out of contact and the base portion are moved away from the countermold.

16. (Currently amended) ~~A method according to any one of claims 13 to 15, characterized in that, after unmolding, the object (10) is picked up by pick-up means (30A, 30B), said object ceases to be held relative to the countermold (18; 118; 218), and the pick-up means carrying the object are moved~~claim 24, wherein, before the undercut-forming portions of the mold are moved apart, the mold and the countermold are moved relative to each other so as to place their respective ends out of contact.

17. (Currently amended) ~~A method according to any one of claims 13 to 16, characterized in that, in order to hold~~claim 24, wherein, after unmolding, the object is picked up by pick-up means, said object ceases to be held relative to the countermold, ~~holding means (23A, 23B; 223A, 223B, 223C) are moved from an inactive position to an active position in which they are suitable for holding the object (10) relative to the countermold (18; 118; 218) and the pick-up means carrying the object are moved.~~

18. (Currently amended) A method according to claim 17, ~~characterized in that~~
~~the~~24, wherein, in order to hold the object relative to the countermold, holding means (23A,
23B) are moved from their~~an~~ inactive position to ~~the active position after the undercut forming~~
~~portions (12A, 12B; 112A, 112B) of the mold have been moved apart~~an active position in which
said holding means are suitable for holding the object relative to the countermold.

19. (Currently amended) A method according to claim 18, ~~characterized in that, in~~
~~order to hold the object (10) relative to the countermold (18; 118),~~wherein the holding members
(23A, 23B) means are moved between~~from their inactive position to the active position after the~~
~~undercut-forming portions of the mold, as spaced~~have been moved apart ~~from each other.~~

20. (Currently amended) A method according to claim 17, ~~characterized in that the~~
~~holding members (223A, 223B, 223C) are moved from their inactive position to the active~~
~~position before the object (10) is thermoformed, and in that~~said 24, wherein, in order to hold the
object relative to the countermold, the holding members are returned to their inactive position
only once~~moved between the undercut-forming portions of the mold have been moved, as spaced~~
apart from each other.

21. (Currently amended) A method according to claim 20, ~~characterized in that the~~
~~object (10) is thermoformed from a pellet of thermoplastic material (201), and in that, before said~~
~~object is thermoformed, the periphery of said pellet is shaped by means of the holding members~~
~~(223A, 223B, 223C)~~18, wherein the holding members are moved from the inactive position
thereof to the active position before the object is thermoformed, and wherein said holding
members are returned to their inactive position only once the undercut-forming portions of the
mold have been moved apart.

22. (New) A method according to claim 21, wherein the object is thermoformed from
a pellet of thermoplastic material, and wherein, before said object is thermoformed, the periphery
of said pellet is shaped by means of the holding members.

23. (New) A device according to claim 11, wherein each of the edge portions is provided with at least one anchoring piece in relief for anchoring into the thermoplastic material.

24. (New) A method of thermoforming an object presenting an undercut portion and a base portion, the method comprising the steps of in: using a thermoforming mold having a base portion and at least two undercut-forming portions in the vicinity of an open end; clamping a piece of thermoplastic material by means of the end of a countermold against said end of the mold; defining a thermoforming cavity with said mold portions; bringing a thermoforming piston into a thermoforming active position in which said piston penetrates into the cavity of the mold from an inactive position in which the piston is situated outside said cavity; and, in order to enable the object to be unmolded, moving said undercut-forming portions of the mold apart; and moving the base portion of the mold away from the countermold while holding the object relative to the countermold.